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January 16, 2008

Atty. Docket No. US-115

In re application of: AKHVERDIAN et al.
Application. No.: 10/673,786
Filing Date: September 30, 2003
Title: Method for Producing L-Threonine Using Bacteria Belonging to the Genus Escherichia

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA. 22313-1450

Sir:
Transmitted herewith is a Reply Brief in response to the Examiner's Answer in the above-identified application issued on November 16, 2007.

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Respectfully submitted,

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Date: January 16, 2008

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	
AKHVERDIAN et al.	Art Unit: 1652
Application No.: 10/673,786	Examiner: RAMIREZ, Delia M.
Filing Date: September 30, 2003	Attorney Ref. No.: US-115
For: METHOD FOR PRODUCING L-THREONINE USING BACTERIA BELONGING TO THE GENUS ESCHERICHIA	Confirmation No.: 7880

REPLY BRIEF FOR APPELLANT

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

COMES NOW the Appellant to present this Reply Brief in support of the appeal of the final rejection of Claims 12, 15-16, 19, and 21-24 contained in the Office Action dated January 18, 2007 ("Final Rejection"), and to respond to the Examiner's Answer dated November 16, 2007 in the above-captioned patent application. A petition for an extension of time is not necessary, as this Reply Brief is being filed within two months of the mailing of the Examiner's Answer.

It is not believed that extensions of time are required, beyond those that may otherwise be provided for in accompanying documents. If, however, additional extensions of time are necessary to prevent abandonment of this application or dismissal of this appeal, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and the Commissioner is hereby authorized to charge fees necessitated by this paper, and to credit all refunds and overpayments, to deposit account 50-2821.

For the following reasons, Appellant respectfully submits that the final rejection of each of Claims 12, 15-16, 19 and 21-24 in this application is in error, and therefore respectfully requests reversal of the rejections.

B. Status of Claims

Claims 1-11, 13-14, 17-18, 20-22, and 24 are canceled. Claims 12, 15-16, 19 and 23 are pending. No claims are in condition for allowance. Claims 12, 15-16, 19 and 23 stand finally rejected in the Advisory Action dated May 11, 2007, and are on appeal.

C. Ground of Rejection to Be Reviewed on Appeal

Whether Claims 12, 15-16, 19, and 23 are unpatentable under 35 U.S.C. §103 over the disclosure of Katsumata et al. in view of the disclosures of Debabov et al., Edwards et al., and further in view of Kishino et al..

D. Argument

In the Examiner's Answer dated November 16, 2007, beginning at page 3, Claims 12, 15-16, 19 and 23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Katsumata et al. in view of Debabov et al., Edwards et al., and further in view of Kishino et al..

Appellants present this Reply Brief to add some further pertinent comments in light of selected comments in the Examiner's Answer. Although not all the comments made in the Examiner's Answer are addressed in this Reply Brief, the arguments and assertions set forth in the Appeal Brief filed September 5, 2007 still stand and may be referred to as necessary.

Appellants would like to explain why the Examiner's assertion that the threonine synthetic pathways of *C. glutamicum* described in the prior art would be predicative of the same pathways in *E. coli* is incorrect. Specifically, although the threonine synthetic pathways of *E. coli* of the present invention and those of *C. glutamicum* described in Katsumata *et al.* are similar, there are many differences in these pathways between the two microorganisms. Specifically, the enzymes which act in each step of the respective pathways are different between *E. coli* and *C. glutamicum*. Furthermore, the feedback mechanisms by various amino acids are also different between these two microorganisms.

For example, in the regulatory pathways and biosynthesis of lysine and threonine, whereas only one type of aspartokinase is required in *C. glutamicum*, three different isozymes of aspartokinase are required for the same function in *E. coli*. As a result, the system of biosynthesis and regulation in *E.coli* is far more complex, as further demonstrated by the fact that the one aspartokinase of *C. glutamicum* is inhibited by the concerted feedback of both lysine and threonine, whereas the three types of isozymes present in this same pathway in *E. coli* are each inhibited separately by lysine, threonine, and methionine, respectively.

To further show the differences between these pathways in these two microorganisms, expression of the aspartokinase gene of *C. glutamicum* is ***not*** repressed by lysine, threonine, or methionine, whereas expression of each isozyme gene in *E. coli* ***is*** repressed by all of these amino acids. Also, *C. glutamicum* has only one isozyme of homoserine dehydrogenase, whereas *E. coli* has two isozymes which work as bifunctional

enzymes, homoserine dehydrogenase/aspartokinase, further adding to the complexity of the pathway.

Thus, the regulatory mechanisms of lysine and threonine biosynthesis of *E. coli* of the present invention are completely different from that of *C. glutamicum*. Due to the increased complexity of this pathway in *E.coli* as compared to *C. glutamicum,* making predications based upon any of the alleged similarities between these pathways would be fraught with difficulty and unpredictability. As such, it would not be obvious to one of ordinary skill in the art from Katsumata et al., either singly or in combination with the other cited references that the method of producing threonine using *E. coli* of the present invention would lead to threonine production.

For at least the reasons presented herein, each of the subject matters of Claims 12, 15-16, 19, and 21-24, taken as a whole, are patentable. Accordingly, the rejection of each of Claims 12, 15-16, 19, and 21-24 is reversible error.

E. Conclusion

For at least the foregoing reasons, Appellant respectfully submits that the subject matters of Claims 12, 15-16, 19, and 21-24, each taken as a whole, are patentable. Accordingly, Appellant respectfully requests reversal of the rejections of Claims 12, 15-16, 19, and 21-24 under section 103(a).

Respectfully submitted,

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